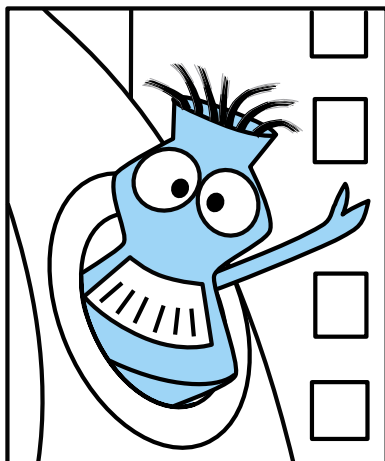


Lesson 6

Evaluate



AT A GLANCE

Overview

By listening to a story in Lesson 6, students follow Exee home to planet Y. There, they see that Exee is trying to help friends understand the environment of the mouth, that mysterious hole in the heads of humans. Students help Exee by placing in sequential order cards that describe a day in the life of Mr. Tooth, who lives inside the mouth. When Exee's friends become sad that Mr. Tooth's day is bad, students make a new sequence that describes a good day for Mr. Tooth, thereby describing how to avoid decay. Students glue both sequences of cards onto paper that they can use to describe how to maintain good oral health.

Purpose

In this lesson, students will

- demonstrate their understanding of the process by which bacteria cause disease in the mouth and
- demonstrate their understanding of ways in which dental disease can be prevented.

Objectives

After completing this activity, students will

- sequence the steps in a normal day that can lead to tooth decay and
- describe how they can maintain a healthy mouth.

BACKGROUND INFORMATION

The Evaluate Lesson

As the Evaluate lesson for the curriculum supplement, Lesson 6 does not present any new information to the students. Instead, the lesson offers students the opportunity to express their understanding of the concepts in the supplement in a new context. As students share and compare their ideas

What Have You Learned about the Mouth?



with those of others, they can refine and revise them. As you listen to them reasoning out loud, you can assess their individual understanding of oral health.

Students who are used to assessments that have either a right or wrong answer may not be comfortable with the type of assessment in this lesson. As a teacher, you may not be used to probing for understanding or judging degrees of understanding along a continuum from incomplete to complete understanding. It helps if you ask questions designed to help students express their ideas. In this Evaluate lesson, students will sequence pictures that depict the process of tooth decay and those that depict ways that people can take care of their oral health. Questions that you might ask as you visit each of the students working on their sequence are the following:

- What makes you think this picture goes here?Ä
- How did you get that idea?Ä
- What else can you tell me about...?Ä
- Why did you choose...?Ä
- What made you change your mind?Ä
- Is there something else that you want to tell me about your sequence?Ä
- What changes would you make to help Mr. Tooth have a good day?Ä

Although it is time consuming, conduct individual interviews with students as they work on their sequence. Such interviews are the most effective strategy for assessing understanding. They also give students an opportunity to justify their picture placements and provide you with insight into their conceptions. In addition, you have the advantage of varying the assessment to correspond with the level of each student. Interviews are especially useful in helping you assess the understanding of quiet students who often are overshadowed by their teammates.

With interviews, you can probe beyond the pat answers or memorized phrases or terms. The interview can be brief and informal as you circulate around the room, or they can be scheduled one-on-one during recess or another break time. You will find that it works well to combine an interview with the activity in this lesson; the pictures serve as manipulatives that students can use to demonstrate what they understand.

Authentic Assessment

This lesson is not the only opportunity you have had to assess your students' progress. As noted in each of the previous lessons, assessments have gone hand in hand with instruction throughout the curriculum supplement. Whenever individual students expressed themselves by talking, writing, drawing, or performing tasks, you have had an opportunity to assess their thinking and thus their learning. The assessment tasks are embedded within the lessons and offer you the opportunity to:

- determine students' initial understanding of concepts to be learned,
- determine students' initial familiarity with processes and their ability to use them,
- monitor students' conceptual development and ability to use certain processes and skills, and
- collect information about students' achievement of the outcomes of each lesson and of the supplement as a whole.

For example, the *Mouth Journal* is a useful diagnostic and evaluative tool that you can use for assessment. A student's journal is a permanent and continual record of what the student is learning and thinking. By reading the journals regularly, you can identify students who need extra help as well as those who might have special knowledge to share with the class. As a summative evaluation tool, the entries in the journals can be compared with the outcomes for each lesson to see how many of the outcomes are expressed in writing or drawing in the journals. In addition, the journals provide one method of keeping parents and guardians informed of student progress with tangible representations of learning.

The approach to assessment in this supplement is congruent with the following recommendations in the *National Science Education Standards*.¹

- Assessment tasks are deliberately designed.Ä
- Assessment tasks have explicitly stated purposes.Ä
- Assessment data focus on the science content that is most importantÄ for students to learn.Ä
- Assessment tasks are valid and authentic.Ä
- Students have adequate opportunities to demonstrate their Ä achievements.Ä
- Assessment tasks are set in a variety of contexts.Ä
- Assessment tasks include opportunities for students' self-assessmentÄ and reflection.Ä

IN ADVANCE

Activities that include the CD-ROM	
Activity Number	CD-ROM
Activity 1	optional

Photocopies

Activity Number	Master Number	Number of Copies
Activity 1	Master 6.1, <i>A Bad Day for Mr. Tooth Template Page</i>	1 copy for each student
	Master 6.2, <i>A Bad Day for Mr. Tooth Pictures</i>	1 copy for each student
	Master 6.3, <i>A Good Day for Mr. Tooth Template Page</i>	1 copy for each student
	Master 6.4, <i>A Good Day for Mr. Tooth Pictures</i>	1 copy for each student

Materials

Activity 1

For each student:

- 1 copy of Master 6.1, *A Bad Day for Mr. Tooth Template Page*
- 1 copy of Master 6.2, *A Bad Day for Mr. Tooth Pictures*
- 1 copy of Master 6.3, *A Good Day for Mr. Tooth Template Page*
- 1 copy of Master 6.4, *A Good Day for Mr. Tooth Pictures*
- scissors
- glue
- crayons or markers

For teams of 2:

- CD-ROM (optional)
- Computer

Preparation

- Decide if students will complete the activity using the print version or the CD-ROM version.
- If you plan to use the CD-ROM, arrange for students to have access to the computers.
- Duplicate Master 6.1, *A Bad Day for Mr. Tooth Template Page*, 1 for each student.
- Duplicate Master 6.2, *A Bad Day for Mr. Tooth Pictures*, 1 for each student.
- Duplicate Master 6.3, *A Good Day for Mr. Tooth Template Page*, 1 for each student.
- Duplicate Master 6.4, *A Good Day for Mr. Tooth Pictures*, 1 for each student.
- Gather the materials needed for the activity.
- Have students' *Mouth Journals* (prepared in Lesson 1) available for the Wrap-up exercise.

PROCEDURE

Activity 1: Exee Goes Home

The purpose of this activity is to give students the opportunity to express their understanding of the process of tooth decay and the measures that can be taken to prevent dental disease.

1. **Assemble the students in the group area and ask, What do you think happened to Exee?**

Students will remember that Exee was a visitor to Earth from Ä planet Y. Allow them to discuss what they think visitors to our Ä planet might want to know. Help them recognize that Exee was inter-Ä ested in information to bring back to his planet. He was Ä particularly curious about mouths, since he did not have one. Ä

2. **Tell the students that Exee decided to return to planet Y after learning all about the mouth and what happened inside it. Then, read to them a story about Exee's return to planet Y.**

Home at Last

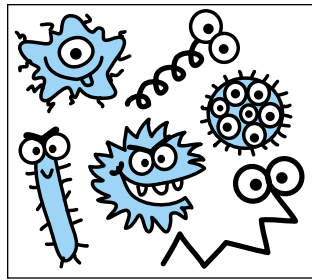
"Wow!" thought Exee. "What a neat planet Earth is. I loved all the different places I discovered, jungles and waterfalls, deserts and mountains, oceans and puddles. But, my favorite places were the little ones, like the places between human toes, and behind human ears, and inside human mouths. I can't wait to tell my friends on planet Y all about these new and different places."

So, Exee flew back to planet Y, going miles and miles across space. When Exee landed, all friends gathered for the homecoming. They were excited to see that Exee was safe and was home again after being gone such a long time. They also wanted to hear about all the new and different things on planet Earth.

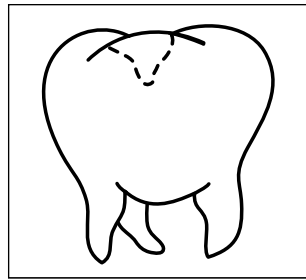
Exee began telling them. He described everything so well that they could picture in their minds the tall mountains. They could almost hear the rushing water of the waterfalls. They believed they could feel the hot sun in the desert. But the mouth? Now, that was hard to imagine.

Exee's friends were very confused. Exee needed pictures to help him describe what the mouth was like and what happened inside it. He pulled out his photo album of the trip and opened it up. Suddenly, a burst of wind on planet Y blew all his photos onto the ground in a jumbled mess. Exee needed help!

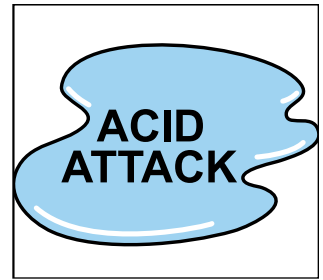
3. **Ask the students if they think they could help Exee put his pictures back in order. Ask students to return to their desks, then distribute one copy of both Master 6.1, *A Bad Day for Mr. Tooth Template Page*, and Master 6.2, *A Bad Day for Mr. Tooth Pictures*, to each student. Review each picture with the students so they understand the illustrations.**



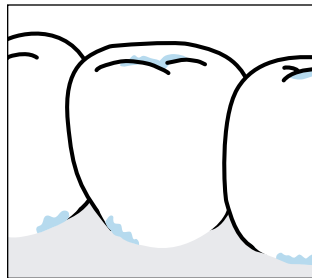
Bacteria



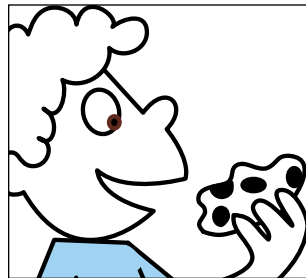
White spot



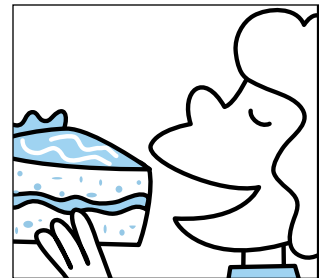
Acid attack



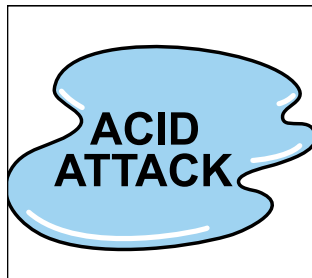
Plaque



Eating



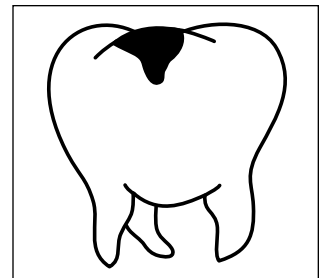
Eating



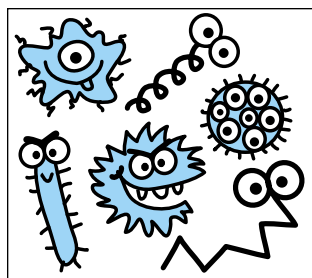
Acid attack



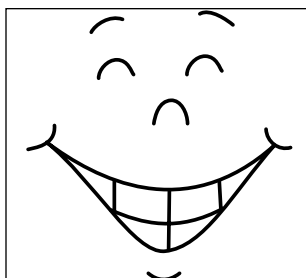
Plaque



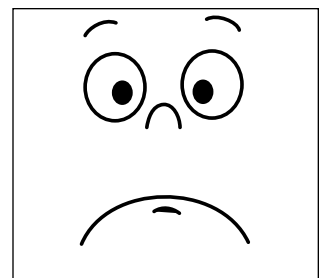
Cavity



Bacteria



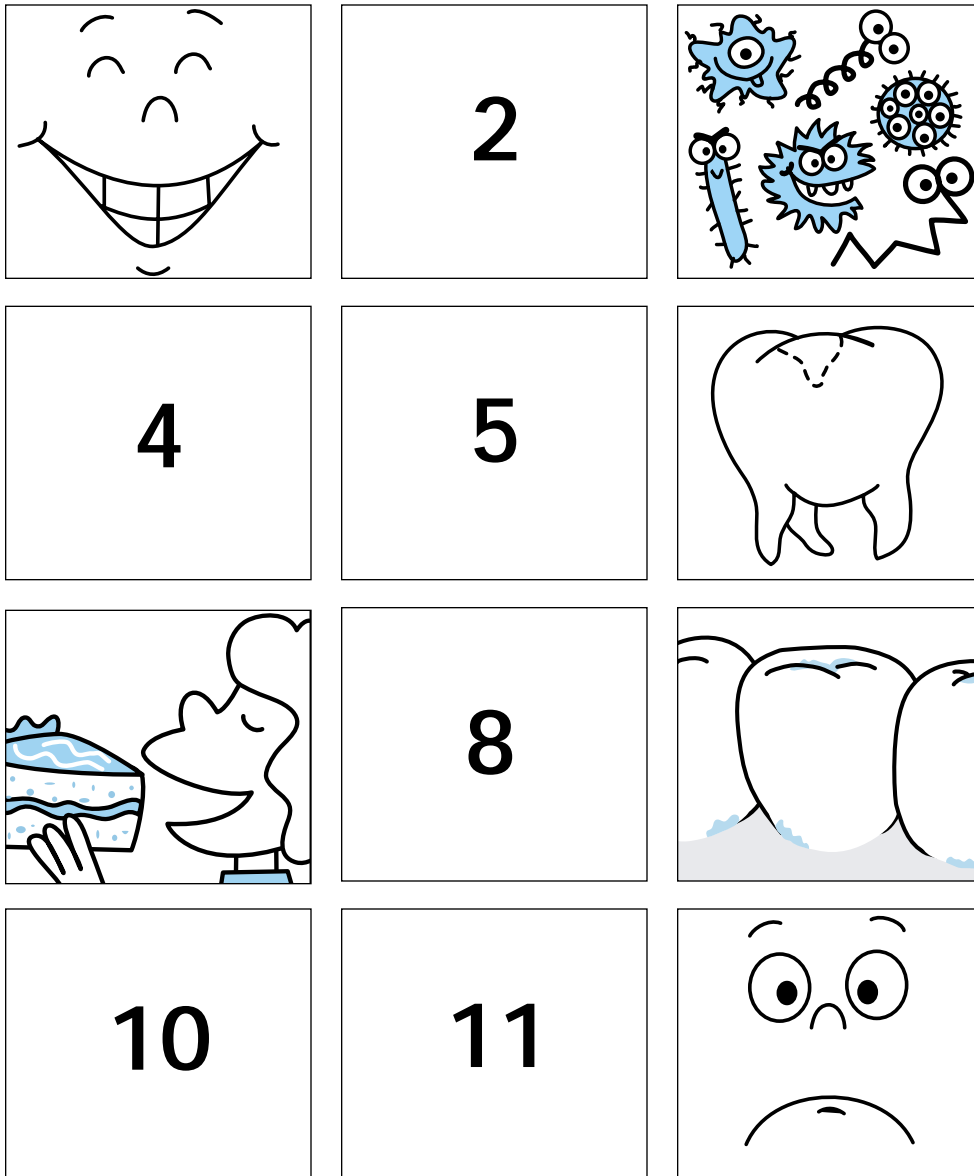
Happy face



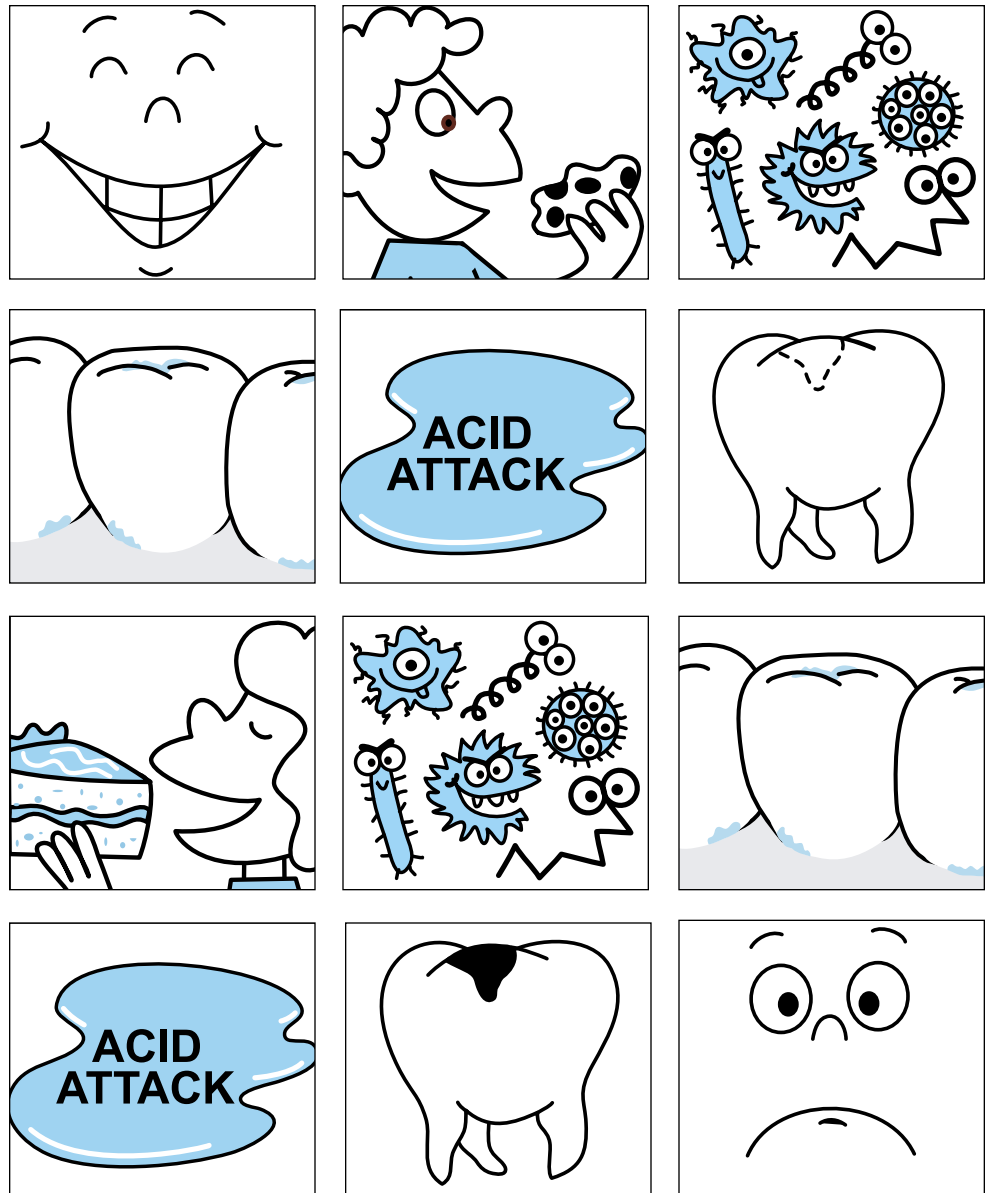
Sad face

4. Direct students to cut out the pictures so that they will be just like those that Exee needed to put in order.
5. Once students have cut out their pictures, tell them that these were the pictures Exee had taken of a bad day in the life of Mr. Tooth. Ask students to put the pictures in order so that Exee can use them to describe what can happen in a human mouth.

If sequencing all the pictures is too difficult for the students, help them by telling them which pictures go in certain places. Start them out by telling the students that the picture of the happy face goes in box 1 on the template page. The picture of bacteria belongs in box 3, the white spot in box 6, and plaque in box 9, as shown in the following illustration. Mr. Tooth is sad at the end, as shown in box 12.



Then have students work independently to put the remaining pictures in order. The solution is shown in the following illustration.



Circulate around the room so that you can see how students are doing with the task. Offer encouragement and ask questions to help students who might be struggling, such as these:

- What do you think happened last to Mr. Tooth? (He decayed.)
- What do you think caused Mr. Tooth to decay?
- How can you use the pictures in the middle to describe how he decayed?
- (See additional questions in *Background Information: The Evaluate Lesson*.)



Content Standard A:
Abilities necessary to do
scientific inquiry.

Students should be able to tell you why they placed each picture in the order that they did. You should expect to hear that, in the beginning, the mouth was healthy with all teeth intact. Then, the mouth ate lots of sugary and starchy foods. The bacteria in the mouth were nourished by the sugar and multiplied. When they ate and multiplied, they also left behind waste products: acids. After some time, the acids caused a white spot on the tooth where they dissolved some of the enamel. Then, the acids continued to eat away the enamel until the tooth got a cavity.

6. **Instruct students to glue their final sequence on Master 6.1, *A Bad Day for Mr. Tooth Template Page*.**
7. **When all the students have completed their sequence and you have circulated around to see that all students understand their sequence and can describe it accurately to you, continue with the story:**

Home at Last (continued)

Exee finally got all his pictures in order. As he was describing what happened inside the mouth, some of his friends started to cry.

"Why are you crying?" asked Exee.

"The story about Mr. Tooth is so sad!" cried his friends. "Mr. Tooth is gone, destroyed, kaput!"

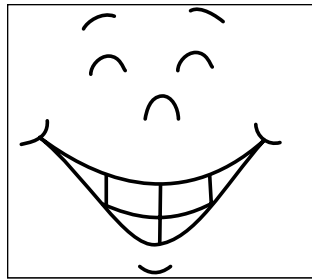
"Wait a minute, everybody," said Exee. "I have shown you pictures only of Mr. Tooth's bad day. The story doesn't have to end like that. Here, let me show you some new pictures."

Exee's friends gathered around him, and soon they were laughing and chattering away happily. They weren't worried about poor Mr. Tooth anymore.

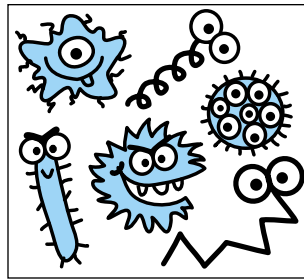
8. **Ask students, What pictures do you think Exee showed his friends? What things could Exee tell his friends that would make Mr. Tooth's bad day much better?**

Hold a brainstorming session with your students about the things they know would make Mr. Tooth not have such a bad day (not have tooth decay). Students might mention brushing, flossing, avoiding sweets, visiting the dentist, not snacking often, and so on.

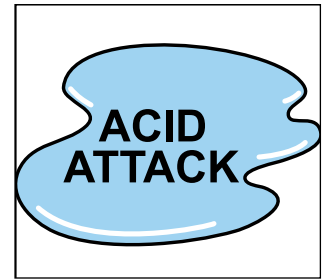
9. **Distribute one copy of both Master 6.3, *A Good Day for Mr. Tooth Template Page* and Master 6.4, *A Good Day for Mr. Tooth Pictures*, to each student. Review and describe what is going on in each of the pictures on the page.**



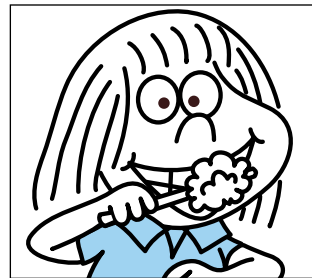
Happy face



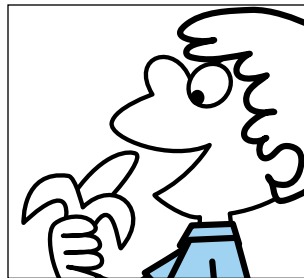
Bacteria



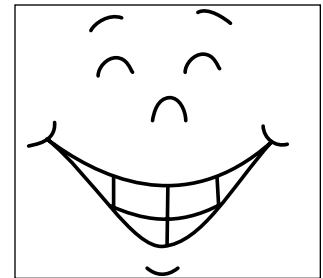
Acid attack



Brushing with fluoride toothpaste



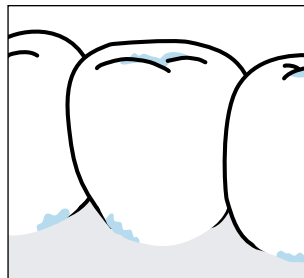
Eating



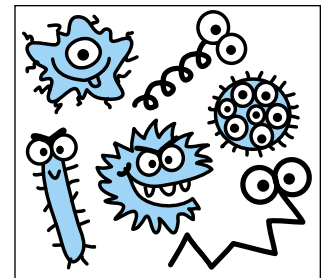
Happy face



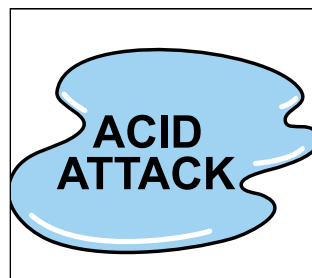
Drinking



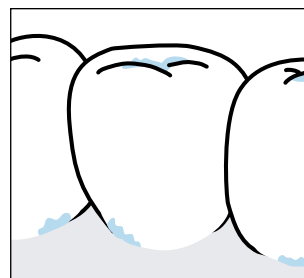
Plaque



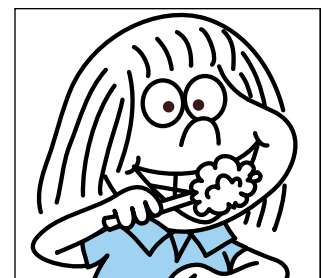
Bacteria



Acid attack



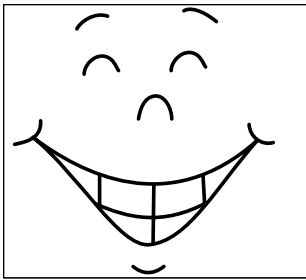
Plaque



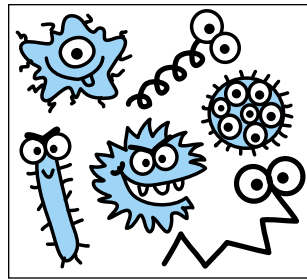
Brushing with fluoride toothpaste

10. Ask students if they think they can sequence the pictures to make Exee's friends much happier. Direct students to use these pictures to put together a story called "A Good Day for Mr. Tooth."

As before, circulate around the room so that you can evaluate how the students are doing with the task. If the sequencing is too difficult for the students, help them get started by telling them where certain pictures belong in the sequence. The following illustration suggests which pictures to use for prompting the students.

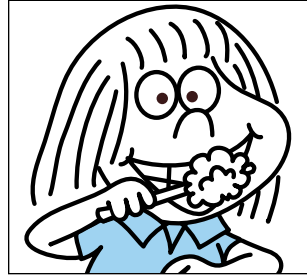


2



4

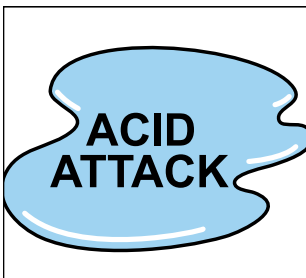
5



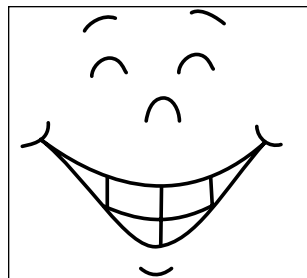
7

8

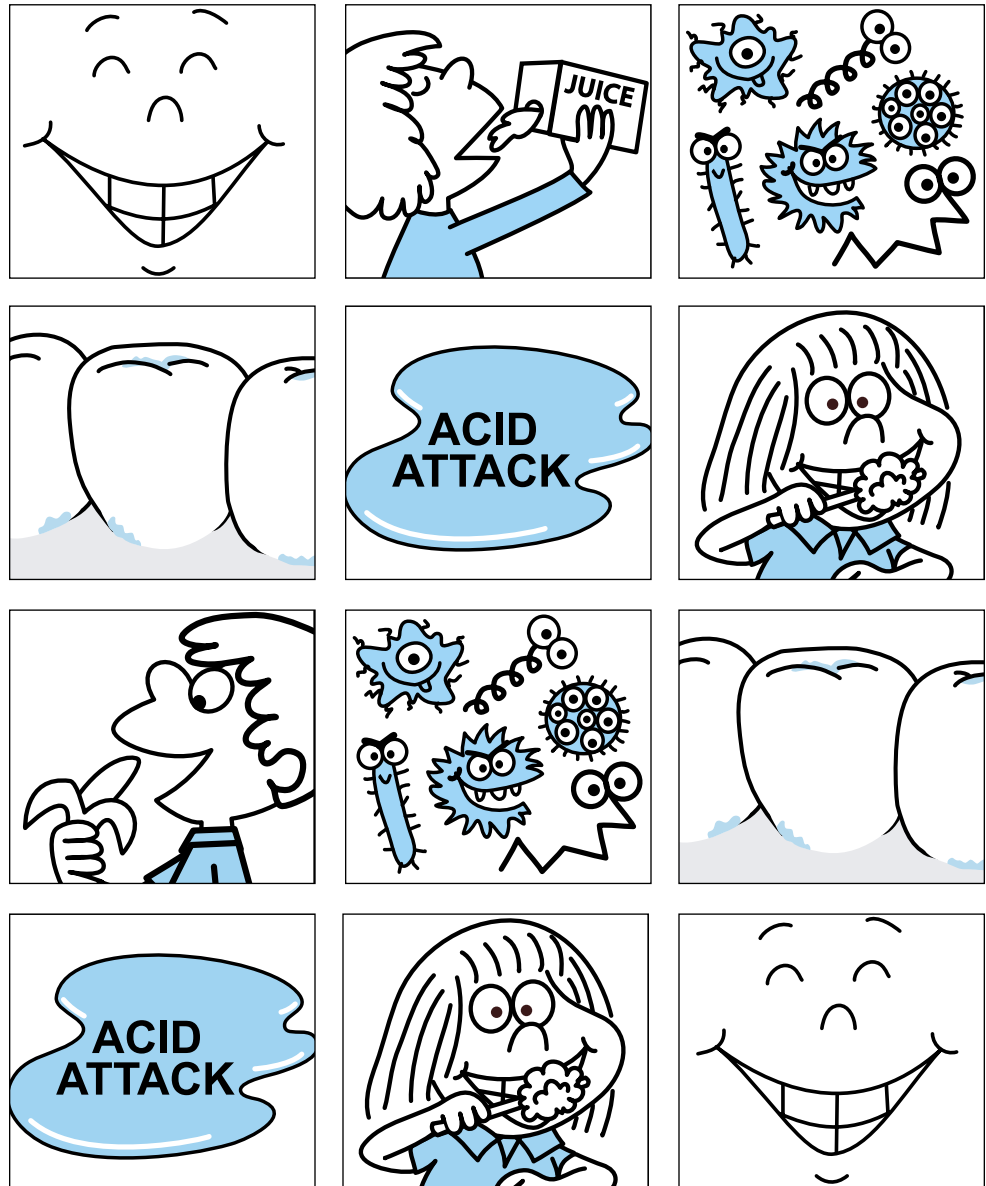
9



11



The solution to the sequencing activity is shown in the following illustration.



11. At this time, an individual interview with each student would be optimal. Ask each student to show you his or her sequences and tell you why he or she chose the pictures in that order.

If necessary, manipulate some of the pictures and ask the student to tell you why the new order was better for Mr. Tooth or not as good for Mr. Tooth. In this way, you can probe for understanding of some of the science concepts that underlie the reasons for things like brushing after meals, avoiding sugary and starchy foods, and limiting between-meal snacks. Once the student has determined a sequence, have him or her glue the pictures onto Master 6.3, *A Good Day for Mr. Tooth Template Page*, for a permanent record.



Content Standard A:
Abilities necessary for
scientific inquiry.
Content Standard F:
Personal health.

Alternately, if time does not allow you to interview each student, ask students to glue their final sequence onto Master 6.3, *A Good Day for Mr. Tooth Template Page*. Collect the sequences and assess them for how well they display understanding. If you see a sequence that confuses you or does not accurately portray a good day for Mr. Tooth, you can interview the student who did the work and check if he or she understands the concepts of tooth decay and cavity prevention.

12. **Invite the students to continue putting Exee's pictures in sequence using the activity on the CD-ROM. Instruct students to work in pairs on the activity.**



From the main menu, select *Exee Says Good-bye*.

Encourage pairs of students to collaborate on their sequence and then submit it for evaluation by the computer. In this way, you will be encouraging continued dialogue about the processes that take place in the mouth that lead to either poor or good oral health.

13. **Congratulate the class on a job well done.**

Wrap-up

Ask students to complete their journals. Encourage them to write about their own ideas and what they thought was important and most interesting about the six lessons in this supplement. Remind them that they can write about their thoughts, ideas, and feelings about science and what they learned about oral health as well as facts about the mouth.



Encourage students to share what they have written or drawn in their journals with their classmates. Some students will always be eager to read aloud from their journals, but encourage all students to read aloud at some point. Sharing is important because it permits students to learn by example, boosts self-esteem, provides a chance for students to reflect on what they learned, encourages students to compare their ideas with others, and gives the teacher the chance to elaborate on concepts in which students are interested or with which students are having difficulty.



Assessment:

Help students decide when their journals are complete, but don't expect a finished, edited product. To promote writing, allow students to be creative and take risks with their writing. Read each student's journal and respond to the quality of thinking and observing.